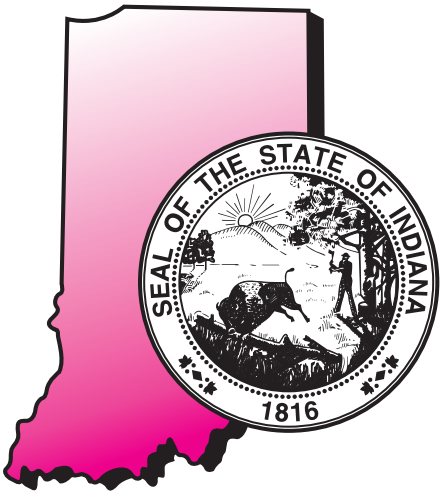
ISTEP+ Fall 2007

Indiana Statewide Testing for Educational Progress

English/Language Arts • Mathematics

Grade 9



Indiana Department of Education

Web Version

Use only a Number 2 pencil to respond to the questions in this book. Responses written in pen CANNOT be scored.

Whenever you see this icon, you will be doing a writing activity. Your writing will not be scored on your personal opinions or choices, but will be scored objectively on

- how clearly you address the prompt
- how well you organize your ideas
- how effectively you express yourself
- how consistently you use correct paragraphing, grammar, spelling, and punctuation

Be sure to use the rules of Standard English. Standard English is the English commonly used in formal writing. It does not include slang or jargon.

Acknowledgments: CTB is indebted to the following for permission to use material in this book.

"Built on Thin Air!" by Nick D'Alto from *Odyssey* Magazine's September 2002 issue: Super Structures: Engineering the Future, copyright © 2002 by Cobblestone Publishing, 30 Grove Street, Suite C, Peterborough, NH 03458. All rights reserved. Reprinted by permission of the publisher.

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Test 5: English/Language Arts

Too Much Trash!

Read the writing prompt below and complete the writing activity.

> Littering has recently become a problem in your community. While many people use proper receptacles, plastic bottles, soda cans, and papers continue to litter parks, shopping malls, and sidewalks. A citizens' committee has been organized to address this problem.
>
> Think of a creative solution to the problem of litter in your community. Then write a persuasive letter to the citizens' committee in which you describe your solution and how it will affect both the community and its litter problem. Be sure to include specific reasons why your solution will solve the problem of littering in your community.

Be sure to include

- a description of your solution
- how your solution will affect both the community and its litter problem
- specific reasons why your solution will solve the problem of littering in your community
- the parts of a letter
- an introduction, a body, and a conclusion to your persuasive letter

Use the Pre-Writing/Planning space or additional paper for notes, lists, webs, outlines, or anything else that might help you plan your writing. Then write your persuasive letter on the lined pages. Be sure to write neatly. Using the Editing Checklist on page 9, check your writing for correct paragraphing, grammar, spelling, punctuation, and the use of Standard English.

NOTE: Only your writing on the lined pages in this book will be scored.

Pre-Writing/Planning

Go On

Pre-Writing/Planning

Persuasive Letter

Go On

Go On

Go On

Now check your writing using this Editing Checklist.

Editing Checklist

1. Check your capitalization and punctuation.
2. Spell all words correctly.
3. Check for sentence fragments or run-on sentences.
4. Keep verb tense consistent.
5. Make sure subject and verb agree.
6. Use words according to the rules of Standard English.
7. Remember to paragraph correctly.

STOP! STOP! STOP! STOP! STOP!

Test 6: English/Language Arts

For Test 6, you will read an article and an excerpt from a fictional story. You will answer questions based on each passage. Then you will write an essay on a related topic.

Have you ever looked at a large structure, such as a tall building or a long bridge, and wondered just what it took to build it? First you will read "Built on Thin Air!" an article that describes a surprising kind of architecture.

Now read "Built on Thin Air!" and do Numbers 1 through 6. You may look back at the article as often as you like.

Go On

Built on Thin Air!

by Nick D'Alto

Take a deep breath, because some of tomorrow's biggest buildings might be inflatable. Find out why—and then design one of your own!

1 Inside Indiana's RCA "Hoosier" Dome, a capacity crowd of 60,000 sports fans roars its approval as the home team takes the field. The great vaulting roof above their heads covers an unbelievable 8 acres (3.2 hectares) and weighs more than 200 tons. And yet the same air those spectators use to breathe (and cheer) is holding up that roof.

2 WHAT?

3 Welcome to the intriguing world of *pneumatic architecture*: structures supported by pressurized air. Forget those tons of steel and concrete in conventional buildings—tomorrow's biggest structures might be built on thin air. Let's see how these ideas hold up (ahem!).

4 Pneumatic structures offer many unique advantages. They're lighter than traditional structures and help engineers design larger buildings at lower cost. Some are even portable—perfect for concerts, fairs, or emergency shelters. Where conventional construction might take months or years, inflatables puff to size in a day. Presto, an instant city!

5 In fact, pneumatic structures are popping up everywhere. Olympic villages and the World's Fair at Osaka, Japan, have featured breathtaking inflatable pavilions. Pneumatic river dams can inflate to hold back floodwaters, and then deflate to permit shipping; they're already in use around Japan. The U.S. military is even using immense inflatable shelters to protect their giant radar dishes.

6 Space Age membranes are making these new buildings possible. Indiana's RCA "Hoosier" Dome and the 10-acre (4-hectare) Silverdome in Pontiac, Michigan, are sheathed with a cloth made of fiberglass coated with Teflon. It's just $\frac{1}{32}$ of an inch thick (0.08 centimeters)—yet pound-for-pound, it's stronger than steel. Still, these super-roofs stretch nearly 1,000 feet (300 meters) in diameter, and weigh in at half a million pounds (over 225,000 kilograms).

Go On

7 How can thin air support such immense structures? Banks of electric fans create the pressure. But the entire pressure is just a measly 5 pounds (2.25 kilograms) per square foot (per 0.09 square meter) above atmospheric pressure—you can push much harder than that. In fact, spectators can't feel any effects when they're inside the building (i.e., breathing is normal).

8 But apply that tiny pressure over the entire roof, and the force is astonishing. In fact, while most roofs want to cave in, air-stressed stadiums must be strapped down with cables, just to stop their roofs from being blown away. Even a puncture is no problem—just run the fans harder.

9 What's next for inflatables? In the countryside, mines or oil refineries might disappear beneath giant inflated domes that would protect workers from rain and wind. Or we might be using a photo-transparent "shell," designed to regulate light and heat, as an "umbrella" for an entire city.

10 And we might not construct that domed city on Earth. That's because inflatables are proving the ideal solution for the new architecture of space. Compared with conventional structures, inflatables are up to ten times lighter. That's good news, because it costs $4,500 per pound ($10,000 per kilogram) to put a payload into orbit.

11 It's also great because extraterrestrial architecture reaches a colossal scale, with telescopes a mile wide and giant "solar sails" to propel spacecraft using the pressure of sunshine. A pneumatic space antenna can stow in a capsule no bigger than a desk, and then inflate to an unbelievable 10 million square feet (over 900,000 square meters). Such superstructures have an added advantage: When they inflate, they "build" themselves—meaning no space walks to assemble the framework. Since they can't use air, these inflatables are blown to size using charges of inert gas.

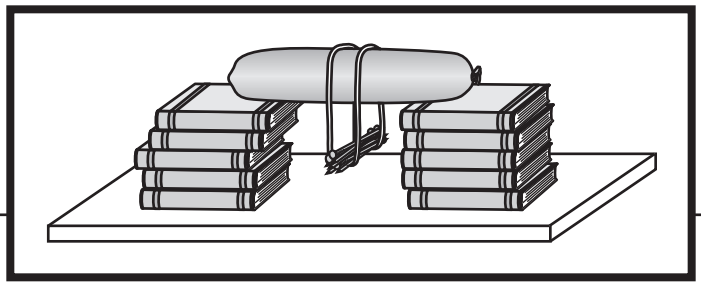
12 But are they strong? Graphite/Kevlar membranes tested at the Marshall Space Flight Center boast tear strength of over one million pounds per square inch. Still, you'd have to stack three of these "superskins" to match the thickness of one sheet of paper. They have to be strong to resist puncture from the micrometeorites[1] that course through space. When our first colonies reach the moon or Mars, don't be surprised if the inhabitants are living and working inside a complex that is transparent and inflatable.

13 Until we do get there, we can verify the futuristic physics of pneumatic architecture by building an inflatable structure of our own.

[1]**micrometeorites:** tiny particles of meteoric dust

Go On

Build It!
Tensile-Stressed Bridge



You'll Need:

- **One long party balloon**
- **18-inch (46-cm) loop of string**
- **12 8d ("eight-penny") common nails**

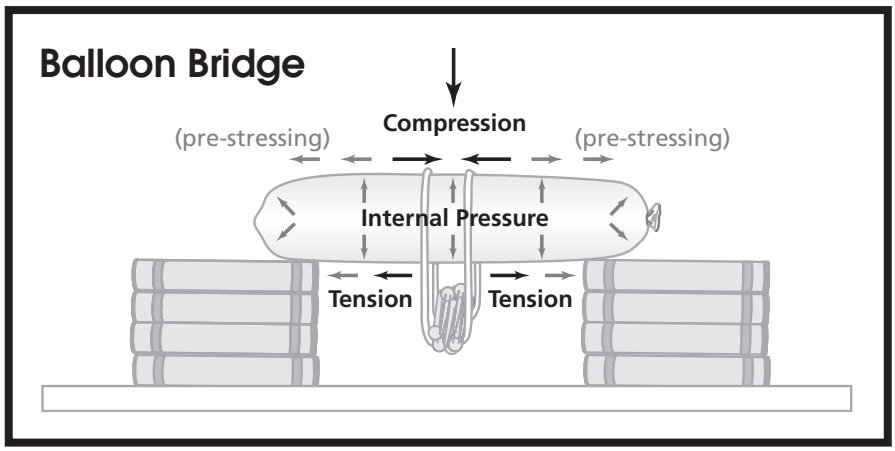
Inflate the balloon and loop the string around it as shown. Then span your "balloon bridge" across two stacks of books about 12 to 15 inches (30 to 38 centimeters) tall.

Inflated beams and ribs are feather-light compared with steel, yet they can stiffen structures and make them incredibly strong. Here's a simple way to prove that.

Watch It Work

Weight down the bridge by hanging nails across the two loops in the string, one at a time (see illustration below). How many nails can the balloon carry before it deflects (sags) noticeably under the load?

Since the balloon is a thin-skin or "membrane" structure, inflating it "pre-stresses" its skin, putting its entire surface under tension (or pulling force). That's one reason inflatable structures are so strong. The bridge can't fall until compression (crushing) along its top cancels out all that tension. If your balloon bridge supports all the nails (about 2 ounces, or 57 grams), it is carrying about 50 times its own weight!



Go On

1 The article states that "tomorrow's biggest structures might be built on thin air." Which of these BEST explains what the author means by "built on thin air"?

- ○ Most pneumatic structures will be constructed in outer space.
- ○ The pneumatic structures also supply oxygen for people to breathe.
- ○ Air lower in oxygen content works best on pneumatic structures.
- ○ Air will supply the main support in pneumatic structures.

2 According to the article, what are TWO different advantages of using pneumatic structures instead of more traditional structures that are built out of steel and concrete?

1) _____

_____

2) _____

_____

3 What is the BEST summary of Paragraphs 7 and 8?

- ○ They explain why air stadiums must be strapped down.
- ○ They demonstrate the large size of pneumatic architecture structures.
- ○ They explain how air can support large, inflatable structures.
- ○ They illustrate why punctures in large, inflatable structures are easy to fix.

Go On

4 In "Build It!" the point of the experiment would be lost if you

- ○ hang the weight from a ruler instead of from a long balloon
- ○ use a ribbon instead of string for hanging the weight
- ○ support the bridge between two chair backs of equal height
- ○ replace the nails with a bag of coins as the weight

5 What are TWO differences between the information in the section "Build It!" and the information in the rest of the article "Built on Thin Air!"?

1) _____

_____

2) _____

_____

6 Which of these techniques does the author use to support his position on pneumatic structures?

- ○ He quotes scientific experts.
- ○ He interviews people at the RCA "Hoosier" Dome.
- ○ He conducts tests at the Marshall Space Flight Center.
- ○ He provides statistics about their strength and lightness.

English/Language Arts

Have you ever had to do a job that was very difficult? What kinds of challenges did you face? You will now read an excerpt from a fictional story about the difficulties a young man faces as he works on his father's fishing boat for the first time. After you read the story, you will answer some questions. Then you will write an essay on a related topic.

Read "The Herring Choker" by William Kent Krueger and then do Numbers 7 through 13. You may look back at the story as often as you like.

Go On

The Herring Choker

by William Kent Krueger

The narrator's father is a herring fisherman who was injured in a fall and has been unable to go out fishing for several days. Winter, fast approaching, will put an end to the fishing season. One evening, restless and feeling the economic pressure caused by his forced layoff, the father asks his son Karl to go along to help with the physical work of fishing. This excerpt describes what happens on the fishing trip.

Lake herring are small fish. They're seldom more than a foot in length or weigh more than a pound. They're usually light green on top, but the scales along their sides are silver as new quarters. They like to swim in large schools. The herring nets are designed to entangle the fish as the school tries to swim through. To harvest them, you need to grasp the fish firmly near their gills and untangle them from the netting. It looks like you're choking them. That's where the name for the fishermen—herring chokers—comes from.

The first net held nearly 200 herring. Picking the fish from the wet webbing was hard work. The water of Lake Superior was bitter cold. Although I wore insulated gloves, it wasn't long before my hands were numb. My father grunted in pain now and then, but he said nothing about his own discomfort. I said nothing about mine.

It took almost two hours to clear and reset the net. We still had two more nets to tend. I was already exhausted. I hadn't realized how demanding the work would be. Or how tedious.

But we got a break. The second net was some distance away. My father offered me hot coffee as he guided the boat

Go On

to our next stop. He had never offered me coffee before. I felt proud. Older. Bigger. The hot coffee warmed my hands as I held the cup.

The second net went faster than the first. I knew what I was doing. By the time we finished, herring covered the bottom of the boat as deep as my calves. For the first time in days, my father seemed happy.

Then he looked at the western sky, and his smile faded.

They are called Northwesters. They're storms that sweep out of Canada hard and fast. No one can predict their arrival. All fishermen fear them.

"We're going back," my father said.

He started the motor, wincing from the pain as he pulled the cord.

We were only two miles out, but the shoreline looked to me to be as far away as the moon. Over the distant hills, black clouds galloped toward us like wild horses. My father set a course directly for them.

We made it only halfway home before we met the storm.

The wind came first. It lifted the lake in whitecaps. The weight of the herring made us ride low in the water, and the waves broke over our bow. The spray was icy cold, needles against my face. I grasped the gunwales[1] as the boat bucked. In the stern, my father struggled to hold us on course. I'd put on my slicker, but I had no life jacket. Most commercial fishermen don't carry life jackets in their boats. Wrong or right, they figure that if your boat goes down, a life jacket is useless. Even if you don't drown, the cold of the water will quickly kill you.

By the time the rain came, we'd put more distance behind us. Although we were now only half a mile from shore, the rain fell so hard we couldn't see the land. The boat was filling with water. I began to bail.

I was scared, but I saw my father sitting erect in the stern, holding the boat steady into the wind, and I felt hopeful. He didn't look hurt at all.

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[1]**gunwales** (gŭn′nəls): upper sides of an open boat

Go On

I was starting to think we were going to make it. That's when the motor died. My father jerked the cord desperately, but the motor wouldn't catch. I saw that the boat was coming about,[2] broadside to the wind. I knew what that meant. We would swamp in no time. We would go down.

My father didn't fight the motor long. He leaped to the middle of the boat, beside me.

"Grab an oar," he hollered above the wind.

He always carried two oars for just such an emergency.

We set the oars in the locks and began to pull hard. My father grunted, from pain or effort I couldn't tell. He dug his oar into the churning lake, bringing the boat around, bow into the wind again. With all my strength, I pulled on my own oar.

The wind pushed hard against us. We seemed to be fighting the anger of the whole lake. I was tired. My arms felt heavy and on fire. I didn't know how much longer I could shove that oar through the water.

As if he heard my thinking, my father called to me, "I need you, Karl. Only a little longer."

So I kept rowing.

Just when I thought I had no more strength, I heard it. The sound of waves breaking against the shore. We moved into the shelter of our small cove and rode the swells toward the landing.

My mother rushed through the rain to greet us. "I've been so worried," she said. She hugged me and then my father.

"Nothing to worry about," he assured her. He put his hand on my shoulder. "You did well, son. How do you feel?"

Tired as I was, I managed a smile. "I feel like a herring choker."

---

[2]**coming about**: turning around

7 Which of these is a MAIN theme of the story?

- ○ a person's conflict with society
- ○ the conflict between humans and the natural world
- ○ a person's conflict with his or her own feelings
- ○ the conflict between two people

8 In the story, the herring fishermen refer to themselves as "herring chokers" because

- ○ the nets sometimes become choked with too many herring
- ○ the herring often stop breathing when the net is pulled into the boat
- ○ it is difficult to remove the herring from the net before they stop breathing
- ○ it looks as if the herring are being choked when they are pulled from the net

9 According to the story, which of these does the narrator suggest was the biggest obstacle the pair faced while fishing?

- ○ The boat motor stops working.
- ○ They carry no life jackets.
- ○ The shore is half a mile away.
- ○ They leave a net unattended.

Go On

10 Read this sentence from the story.

> **We were only two miles out, but the shoreline looked to me to be as far away as the moon.**

According to information in the story, what emotion is Karl MOST LIKELY feeling when he uses the phrase "as far away as the moon"?

Why does the shore seem so far away?

11 During the storm in "The Herring Choker," what mood do the narrator's words and details create?

Give TWO different examples from the story that show how the narrator creates this mood.

1)

2)

12 Choose the BEST summary of "The Herring Choker."

- ○ Two fishermen catch some fish and have to row home after the boat's motor breaks down.
- ○ A father needs his son's help to catch herring and row their boat home.
- ○ A son learns that catching herring is hard and tedious work, but he receives his father's approval for a job well done.
- ○ A son helps his injured father net herring, and then they help each other reach home safely in a storm.

Go On

13

One of the themes in "The Herring Choker" is overcoming difficult circumstances. Write an essay in which you explain how Karl faces such circumstances and how these experiences change how he feels about himself. **In your essay, be sure to include at least TWO examples from "The Herring Choker" of difficulties Karl faces and an explanation of how these experiences change him.**

You may use the space below to plan your writing. Only your writing on the lined pages in this book will be scored. Using the Editing Checklist on page 25, check your writing for correct paragraphing, grammar, spelling, punctuation, and the use of Standard English. **Remember, your essay should be well organized and have an introduction, a body, and a conclusion.**

Pre-Writing/Planning

Essay

Go On

Now check your writing using this Editing Checklist.

Editing Checklist

1. Check your capitalization and punctuation.
2. Spell all words correctly.
3. Check for sentence fragments or run-on sentences.
4. Keep verb tense consistent.
5. Make sure subject and verb agree.
6. Use words according to the rules of Standard English.
7. Remember to paragraph correctly.

STOP! STOP! STOP! STOP! STOP!

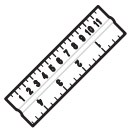
Use only a Number 2 pencil to respond to the questions in this book. Responses written in pen CANNOT be scored.

If you see this symbol, you may use your reference sheet to help solve the problem.

If you see this symbol, you may NOT use a calculator to solve problems in the test.

If you see this symbol, you may use a calculator to solve problems in the test.

This symbol appears at the beginning of the sections that contain gridded-response problems.



If you see this symbol, use your ruler as a straightedge or to solve the problem.

If you see this symbol, use your protractor to solve the problem.

Test 7: Mathematics

Since you may receive partial credit for many of the problems, it is important to show ALL work in the spaces provided in this book. When you see the words **Show All Work,** be sure to

- **show all the steps needed to solve the problem**
- **make your handwriting clear and easy to read**
- **write the answer on the answer line**

1 What is the slope of the graph of the equation $3x + 3y = 18$?

Show All Work

Answer _____

2 ABC Toaster Company manufactures two types of toasters, standard and deluxe. A deluxe toaster takes twice as long to make as a standard toaster.

It takes John 8 MINUTES to assemble a standard toaster. Last week he spent 40 HOURS assembling standard toasters and 40 HOURS this week assembling deluxe toasters.

How many more standard toasters than deluxe toasters can John assemble in 40 HOURS of work?

Show All Work

Answer _____ standard toasters

Go On

3 The manager at Express Mart is using $1,000 to restock the chip aisle and the water aisle. He orders bags of chips for $1.50 per bag and cases of water for $2.00 per case.

Write an inequality that represents the number of bags of chips, c, and the number of cases of water, w, the manager can order.

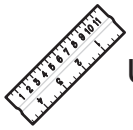
Inequality _____

4 Lisa works 45 minutes each day building shelves for her home. She completes the shelves in 12 days.

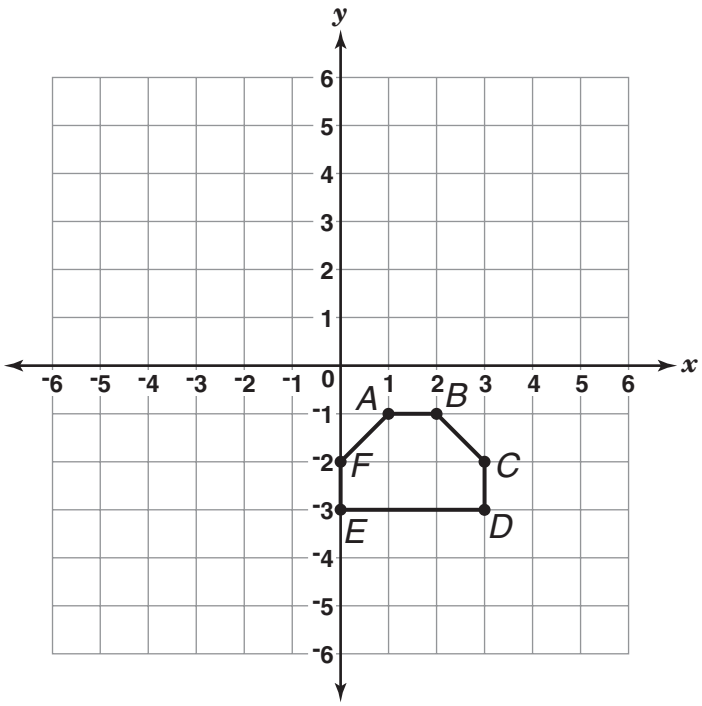
How many HOURS does it take Lisa to build the shelves?

Show All Work

Answer_____ hours

5  Use your ruler as a straightedge.

Draw the image of the figure after a translation of 4 units to the left and 1 unit up.



Go On

6 Consider the system of equations below.

$$3x + 2y = {}^{-}4$$
$$y = {}^{-}2x$$

Solve the system of equations for x and y.

Show All Work

Answer $x =$ _____, $y =$ _____

7 Greg asked 17 people at the mall to name their favorite radio station. His results are shown in the table below.

Favorite Radio Station

Station	Number of People
A	2
B	5
C	4
D	2
E	4

From the survey, Greg concluded that the favorite radio station of students at his school is Station B. Greg's school has a population of 4,000 students.

On the lines below, give two different reasons why Greg's conclusion is NOT reasonable.

1) _____

_____

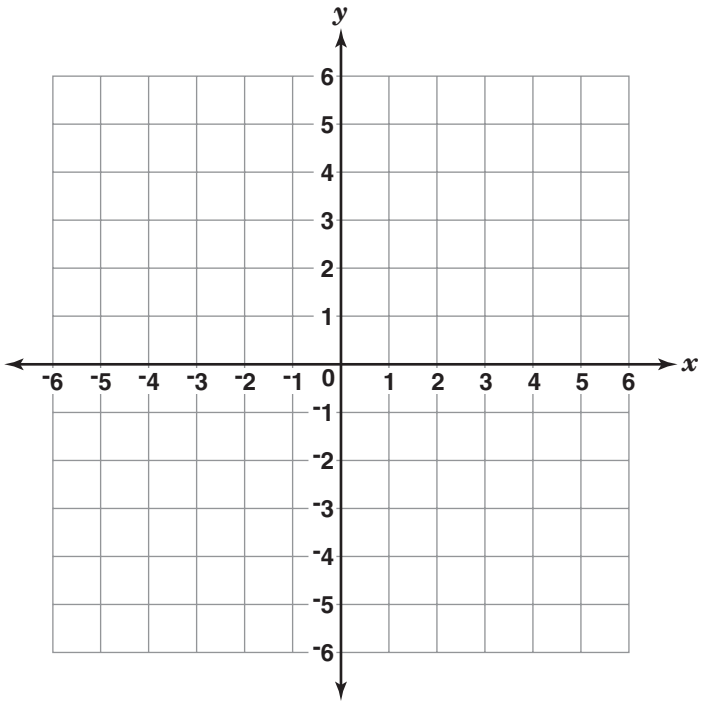
2) _____

_____

Go On

8 Use your ruler as a straightedge.

Graph the equation $y = \frac{1}{2}x + 2$ on the coordinate plane below.



STOP! STOP! STOP! STOP! STOP!

STOP

Test 8: Mathematics

Since you may receive partial credit for many of the problems, it is important to show ALL work in the spaces provided in this book. When you see the words **Show All Work,** be sure to

- **show all the steps needed to solve the problem**
- **make your handwriting clear and easy to read**
- **write the answer on the answer line**

1 Larry is having dinner at a restaurant that offers 6 different main courses, 7 different side dishes, 4 different drinks, and 4 different desserts. For dinner, Larry will choose a main course, a side dish, a drink, and a dessert.

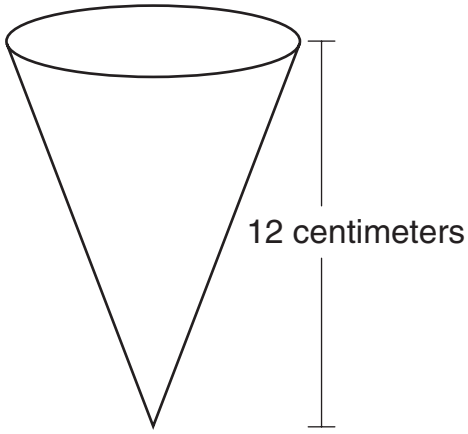
From how many different combinations can Larry choose dinner?

Show All Work

Answer _____ combinations

Go On

2 The ratio of the height of the cone shown in the diagram below to the diameter of the base is 2 to 1.



What is the volume, in cubic centimeters, of the cone?

Show All Work

Answer _____ cubic centimeters

3 A repair person charges a flat fee plus an hourly rate. The equation below gives the total cost, c, in terms of the number of hours, h, of service.

$$c = 50h + 250$$

For 6 hours of service, the total cost is $550.

What is the hourly rate the repair person charges?

Answer $ _____

What is the flat fee the repair person charges?

Answer $ _____

Go On

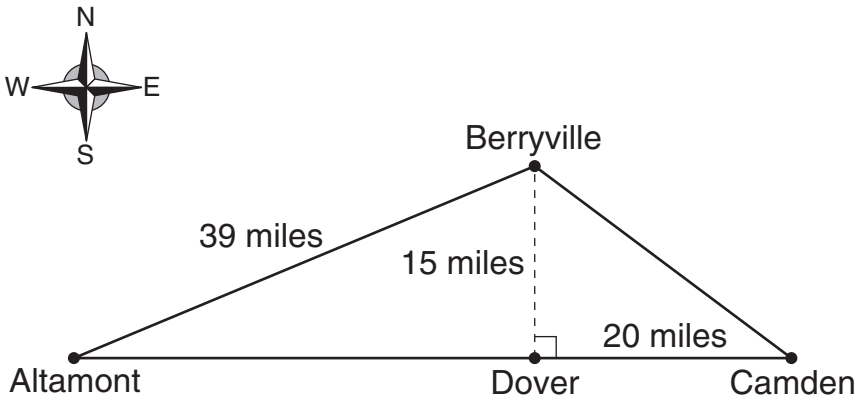
4 Mike is testing new batteries to determine if the batteries last as long as advertised. The actual life of one of the batteries was only 4 weeks, 2 days, and 13 hours even though the advertisement claimed it would last 3,000 hours.

What was the difference, in HOURS, between the advertised life of the battery and the actual life of the battery?

Show All Work

Answer _____ hours

5 Roads connecting four towns form a triangle, as shown in the mileage chart below.



Talia traveled from Altamont to Berryville to Camden to Dover and back to Altamont to deliver furniture.

What is the total distance, in miles, Talia traveled?

Show All Work

Answer _____ miles

Go On

6 Paul plans to install a border along the perimeter of a square floor. The area of the floor is 121 square feet. The cost of the border and supplies is $2.39 per foot, including tax.

How much money will it cost to install the border?

Show All Work

Answer $ _____

7 For a festival, one flag will be placed every 8 YARDS to form a circular pattern that is $\frac{1}{4}$ MILE long.

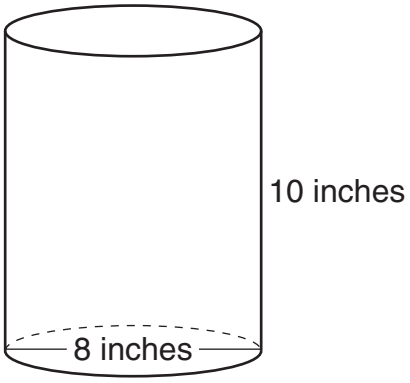
What is the exact number of flags that will be placed to form the circular pattern?

Show All Work

Answer _____ flags

Go On

8 Consider the cylinder shown below.



What is the surface area, in square inches, of the cylinder?

Show All Work

Answer _____ square inches

ATTENTION! Please do not leave your punchouts in this book.

STOP! STOP! STOP! STOP! STOP!

ISTEP+ Grade 9 and GQE Mathematics Reference Sheet

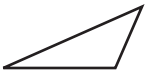
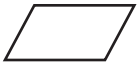
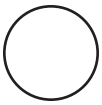
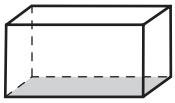
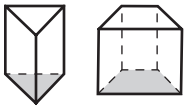
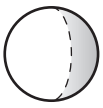
Shape	Formulas for Area (A) and Circumference (C)
Triangle 	$A = \frac{1}{2}bh = \frac{1}{2} \times$ base $\times$ height
Rectangle 	$A = lw$ = length $\times$ width
Trapezoid 	$A = \frac{1}{2}(b_1 + b_2) \times h = \frac{1}{2} \times$ sum of bases $\times$ height
Parallelogram 	$A = bh$ = base $\times$ height
Square 	$A = s^2$ = side $\times$ side
Circle 	$A = \pi r^2 = \pi \times$ square of radius $C = 2\pi r = 2 \times \pi \times$ radius $\pi \approx 3.14$ or $\frac{22}{7}$

Figure	Formulas for Volume (V) and Surface Area (SA)	$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$
Rectangular Prism 	$V = lwh$ = length $\times$ width $\times$ height $SA = 2lw + 2hw + 2lh$ = 2(length $\times$ width) + 2(height $\times$ width) + 2(length $\times$ height)	
General Prisms 	$V = Bh$ = area of base $\times$ height SA = sum of the areas of the faces	
Cylinder 	$V = \pi r^2 h = \pi \times$ square of radius $\times$ height $SA = 2\pi r^2 + 2\pi rh$ = 2 $\times \pi \times$ square of radius + 2 $\times \pi \times$ radius $\times$ height	
Sphere 	$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times$ cube of radius $SA = 4\pi r^2 = 4 \times \pi \times$ square of radius	
Right Circular Cone 	$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \pi \times$ square of radius $\times$ height	
Regular Pyramid 	$V = \frac{1}{3}Bh = \frac{1}{3} \times$ area of base $\times$ height	

Equation of a Line

Slope-Intercept Form:

$y = mx + b$

where m = slope and $b = y$-intercept

Point-Slope Form:

$y - y_1 = m(x - x_1)$

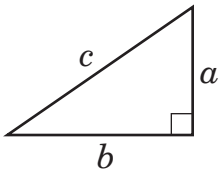
where m = slope and (x_1, y_1) is a point on a line

Slope of a Line

Let (x_1, y_1) and (x_2, y_2) be two points in the plane.

$$\text{slope} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} \text{ where } x_2 \neq x_1$$

Pythagorean Theorem



$$a^2 + b^2 = c^2$$

Distance Formula

$$d = rt$$

where d = distance, r = rate, and t = time

Temperature Formulas

$$°C = \frac{5}{9}(F - 32)$$

$$°\text{Celsius} = \frac{5}{9} \times (°\text{Fahrenheit} - 32)$$

$$°F = \frac{9}{5}C + 32$$

$$°\text{Fahrenheit} = \frac{9}{5} \times °\text{Celsius} + 32$$

Simple Interest Formula

$$i = prt$$

where i = interest, p = principal, r = rate, and t = time

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where $ax^2 + bx + c = 0$, $a \neq 0$, and $b^2 - 4ac \geq 0$

Conversions

1 yard = 3 feet = 36 inches
1 mile = 1,760 yards = 5,280 feet
1 acre = 43,560 square feet
1 hour = 60 minutes
1 minute = 60 seconds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 liter = 1000 milliliters = 1000 cubic centimeters
1 meter = 100 centimeters = 1000 millimeters
1 kilometer = 1000 meters
1 gram = 1000 milligrams
1 kilogram = 1000 grams

1 pound = 16 ounces
1 ton = 2,000 pounds

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